Listing and Amendments to the Claims

This listing of claims will replace the claims that were published in the PCT Application and the International Preliminary Report on Patentability:

1. (currently amended) A video encoder ~~(200, 300)~~ for encoding video signal data for at least one cross-fade picture disposed temporally between a fade-out start picture and a fade-in end picture, which are used as reference pictures for coding the at least one cross-fade picture, the encoder comprising:

a reference picture weighting applicator ~~(292, 392)~~; and

a reference picture weighting factor unit ~~(272, 372)~~ in signal communication with the reference picture weighting applicator for assigning weighting factors corresponding to each of the fade-out start picture and the fade-in end picture, respectively, for coding the at least one cross-fade picture.

2. (currently amended) A video encoder as defined in Claim 1, further comprising a motion compensation unit ~~(290, 390)~~ in signal communication with the reference picture weighting applicator for providing at least one of a motion compensated fade-out start picture and a motion compensated fade-in end picture responsive to the reference picture weighting factor unit for coding the at least one cross-fade picture.

3. (currently amended) A video encoder as defined in Claim 2, further comprising a reference picture store ~~(270, 370)~~ in signal communication with each of the reference picture weighting factor unit and the motion compensation unit for storing each of the fade-out start picture and the fade-in end picture.

4. (original) A video encoder as defined in Claim 2 wherein the reference picture weighting applicator applies a weighting factor selected by the reference picture weighting factor unit to at least one of the motion compensated fade-out start picture and the motion compensated fade-in end picture.

5. (original) A video encoder as defined in Claim 4 usable with bi-predictive picture predictors, the encoder further comprising prediction means for forming first and second predictors from the weighted and motion compensated fade-out start and fade-in end pictures, respectively.

6. (original) A video encoder as defined in Claim 5 wherein the weighted and motion compensated fade-out start and fade-in end pictures, respectively, are each from opposite directions relative to all of the at least one cross-fade pictures.

7. (currently amended) A video encoder as defined in Claim 1, further comprising a motion estimation unit ~~(380)~~ in signal communication with the reference picture weighting factor unit for providing motion estimation responsive to weighting factor in an explicit mode of operation.

8. (currently amended) A video encoder as defined in Claim 2, further comprising a summing unit ~~(394)~~ in signal communication with the reference picture weighting factor unit for applying an offset to the weighted motion compensated reference picture in an explicit mode of operation.

9. (currently amended) A method ~~(700)~~ for encoding cross-fades between pictures, the method comprising:

identifying pictures for which a cross-fade is defined;

determining ~~(714,716)~~ appropriate end-points from pictures for which said cross-fade is defined; and

encoding ~~(718,720)~~ said end-points prior to encoding ~~(722)~~ at least one picture intermediate to said end-points.

10. (original) A method as defined in Claim 9 wherein said end-points from pictures for which said cross-fade is defined are used as reference pictures when encoding at least one picture intermediate to said end-points.

11. (original) A method as defined in Claim 9, further comprising:

receiving a substantially uncompressed fade-out start picture; receiving a substantially uncompressed fade-in end picture;

assigning a weighting factor for the at least one - picture corresponding to the fade-out start picture; and

assigning a weighting factor for the at least one - picture corresponding to the fade-in end picture.

12. (original) A method as defined in Claim 11, further comprising:

computing motion vectors corresponding to the difference between the at least one cross-fade picture and at least one of the fade-out start picture and the fade-in end picture;

motion compensating the at least one of the fade-out start picture and the fade-in end picture in correspondence with the motion vectors;

multiplying the motion compensated at least one of the fade-out start picture and the fade-in end picture by the assigned weighting factor, respectively, to form at least one weighted motion compensated reference picture; and

subtracting the at least one weighted motion compensated reference picture from the at least one cross-fade picture; and encoding a signal indicative of the difference between the at least one cross-fade picture and the at least one weighted motion compensated reference picture.

13. (original) A method as defined in Claim 12 wherein exactly two reference pictures are used, the exactly two reference pictures comprising the pre-coded fade-out start picture, FP0, and the fade-in end picture, FP1.

14. (original) A method as defined in Claim 13, further comprising:

combining the motion compensated fade-out start picture with the motion compensated fade-in end picture prior to subtracting from the at least one cross-fade picture.

15. (original) A method as defined in Claim 12 wherein computing motion vectors comprises:

testing within a search region for every displacement within a pre-determined range of offsets relative to the at least one cross-fade picture;

calculating at least one of the sum of the absolute difference and the mean squared error of each pixel in the at least one cross-fade picture with a motion compensated reference picture; and

selecting the offset with the lowest sum of the absolute difference and mean squared error as the motion vector.

16. (original) A method as defined in Claim 12 wherein computing motion vectors comprises:

testing within a search region for every displacement within a pre-determined range of offsets relative to the at least one cross-fade picture;

calculating at least one of the sum of the absolute difference and the mean squared error of each pixel in the at least one cross-fade picture with a first motion compensated reference picture corresponding to the fade-out start picture;

selecting an offset with the lowest sum of the absolute difference and mean squared error as the motion vector for the fade-out start picture;

calculating at least one of the sum of the absolute difference and the mean squared error of each pixel in the image block with a second motion compensated reference picture corresponding to the fade-in end picture; and

selecting an offset with the lowest sum of the absolute difference and mean squared error as the motion vector for the fade-in end picture.

17. (original) A method as defined in Claim 11 wherein the weighting factors for the fade-out start picture and the fade-in end picture, respectively, are each responsive to the relative distance between the at least one cross-fade picture and the fade-out start picture or the fade-in end picture, respectively, in an implicit mode of operation.

18. (currently amended) A video CODEC comprising an encoder as defined in Claim 1 and a decoder ~~(500)~~ for decoding video signal data for a cross-fade picture relative to each of a fade-out start picture and a fade-in end picture to predict the cross-fade picture, the decoder comprising a reference picture weighting factor unit ~~(580)~~ having an output for determining weighting factors corresponding to each of the fade-out start picture and the fade-in end picture.

19. (original) A video CODEC as defined in Claim 18 wherein the reference picture weighting factor unit has a second output for determining offsets corresponding to each of the fade-out start picture and the fade-in end picture.

20. (currently amended) A video CODEC as defined in Claim 18, further comprising a variable length decoder ~~(510)~~ in signal communication with the reference picture weighting factor unit for providing indices corresponding to each of the fade-out start picture and the fade-in end picture to the reference picture weighting factor unit.

21. (currently amended) A video CODEC as defined in Claim 18, further comprising a motion compensator ~~(560)~~ in signal communication with the reference picture weighting factor unit for providing motion compensated reference pictures responsive to the reference picture weighting factor unit.

22. (currently amended) A video CODEC as defined in Claim 21, further comprising a reference picture weighting applicator ~~(570)~~ in signal communication with the motion compensator and the reference picture weighting factor unit for applying a weighting factor to each motion compensated reference picture.

23. (currently amended) A video CODEC as defined in Claim 21, further comprising an adder ~~(590)~~ in signal communication with the motion compensator and the reference picture weighting factor unit for applying an offset to each motion compensated reference picture.

24. (original) A video CODEC as defined in Claim 18 wherein the video signal data is streaming video signal data comprising block transform coefficients.

25. (original) A video CODEC as defined in Claim 18 usable with bi-predictive picture predictors, the decoder further comprising:

prediction means for forming first and second predictors from two different reference pictures;

averaging means for averaging the first and second predictors together using their corresponding weighting factors to form a single averaged predictor.